

Roofing

**Controlling Roofing Related
Hazards**

References

- ◆ EM 385-1-1 Section 27
- ◆ 29 CFR 1926.500 ; Subpart M
- ◆ NFGS 1525 (Latest)
- ◆ Manufacturer's Material
- ◆ Accident Abstracts

Potential Contractor Mishap Outcomes

- ◆ Falls off of roof edge
- ◆ Falls through roof openings
- ◆ Falls through existing sky lights
- ◆ Falls onto or into dangerous processes
- ◆ Falls onto or into dangerous equipment
- ◆ Toxic overexposure to coal tar pitch
- ◆ **Leading to property damage, injury, death**

Direct Causes of Roofing Related Mishaps

- ◆ Unprotected roof openings, skylights, roof perimeters.
- ◆ Working without fall protection.
- ◆ Working outside of guardrails without protection.
- ◆ Working near fall hazard without training.
- ◆ Improper selection, use and maintenance of fall protection systems.
- ◆ Unsafe work practices.

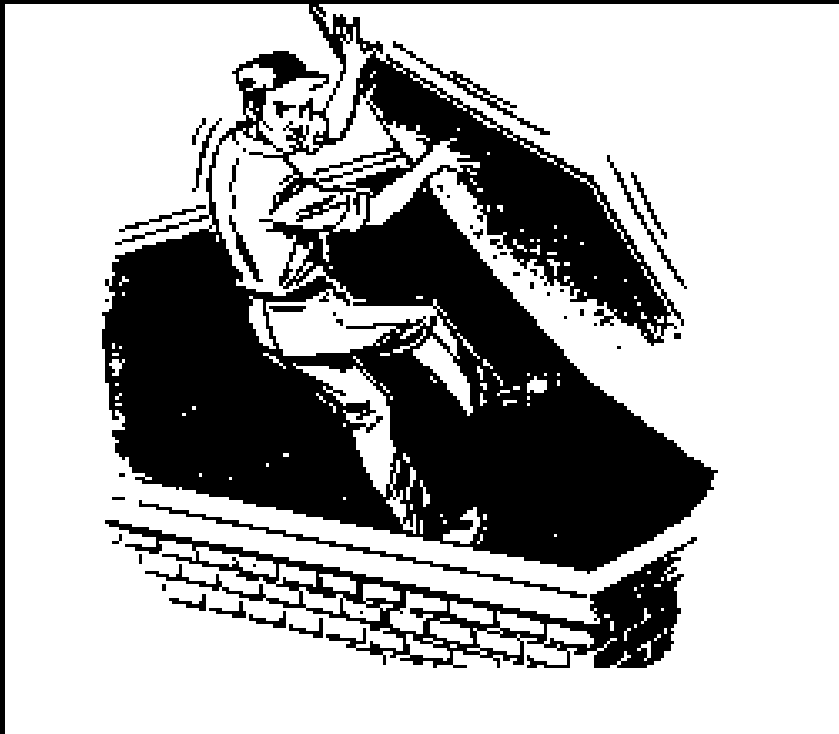
Indirect Causes of Roof Related Mishaps

- ◆ Lack of fall protection training.
- ◆ No SOP for operation.
- ◆ Lack of fall safety supervision.
- ◆ Failure to apply AHA by site superintendent.
- ◆ Inadequate site-specific safety training prior to phase of work.

Indirect Causes of Roof Related Mishaps (continued)

- ◆ Approved safety plan not implemented.
- ◆ Proper equipment, materials & protective system not provided.
- ◆ Daily inspections of protective systems and surrounding area not performed.
- ◆ Lack of management leadership.

Fatal Mishap



- ◆ Roofer handling a piece of fiberboard
- ◆ Backed up and tripped over 7 1/2" parapet
- ◆ Fell over 50 feet and died
- ◆ No fall protection, warning lines or safety monitoring system.

Controlling Roofing Related Hazards

Contractors must use various methods to protect their workers from the hazards associated with working on roofs. These include: Following EM-385 Section 27, Most recent Guide Specifications, and Safety Plan/AHA. Contractor review of associated Accident Abstracts also helpful !

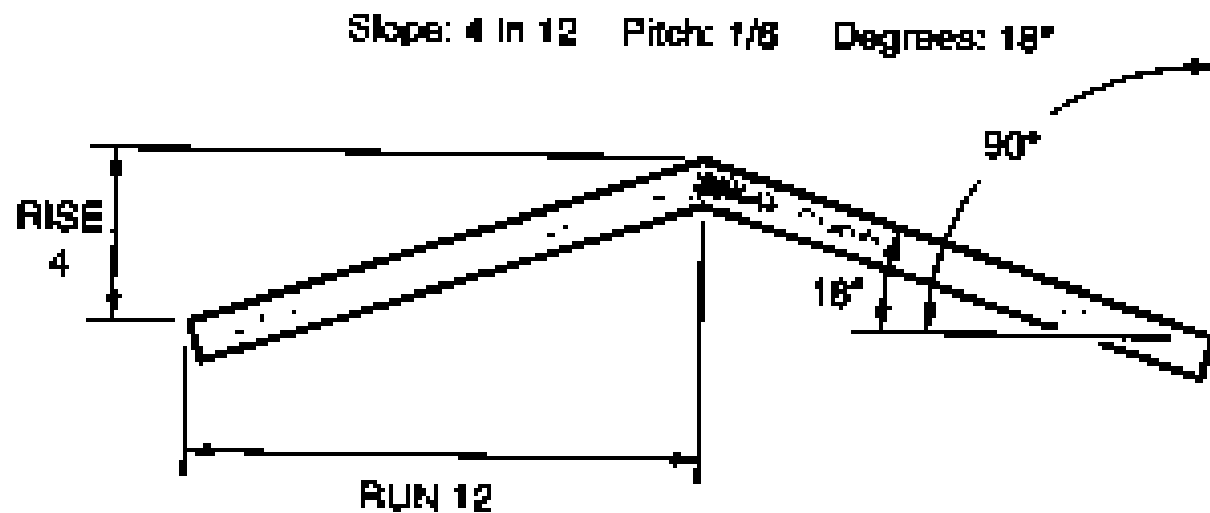
Fall Protection Requirements

- ◆ Fall protection must be provided for workers constructing, maintaining, repairing or demolishing roofs.
- ◆ It must prevent workers from slipping/falling as well as protect workers below from being hit by falling objects.

Fall Protection built-up Roofing

- ◆ Roofs having a slope less than or equal to 4 vertical to 12 horizontal (low sloped) and edges 6 feet or more above lower level.
- ◆ Workers must be protected by one of the following: guardrail system, personal fall arrest system, safety net system; or warning line system combined with guardrail, safety net, PFAS, or safety monitor system.
- ◆ **Note: Greater than 4 in 12 requires general fall protection application.**

Slope: 4 in 12 Pitch 1/6 (18 Degrees)



Warning Line System

- ◆ Cannot be used alone.
- ◆ Must be used with at least a safety monitor.
- ◆ Better if used with a guardrail system, PFAS or safety net system.
- ◆ Only if slope is less than or equal to 4 in 12 (18 degrees or less) ie low sloped.

Warning Line System con't

- ◆ Erected around all sides of the work area.
- ◆ At least 6 feet from roof edge.
- ◆ If mechanical equipment is being used, at least 10 feet from roof edge which is perpendicular to the direction of equipment operation.
- ◆ Consist of ropes, wires or chains solidly attached to each stanchion (no sliding)

Warning Line System con't

- ◆ Rope, wire or chain flagged at least every 6 feet.
- ◆ Lowest point no less than 34 inches, highest not more than 39 inches.
- ◆ Stanchions must be able to resist 16 lb tipping force.
- ◆ Lines must have at least 500 lb tensile strength.

Warning Line System con't

- ◆ No employees aloud in area between warning line and roof edge unless they are performing work in that area.
- ◆ Mechanical equipment must be used or stored in areas on roof protected by warning line, guardrail, or personal fall arrest system.

Poorly Constructed Warning Line



- ◆ Not flagged as required
- ◆ Rope able to slide through each stanchion
- ◆ Any other problems ?

Access Paths

- ◆ Points of access, material handling areas and storage areas must be connected to work areas by clear path formed by two warning lines.
- ◆ When the path is not in use, a rope, chain, wire must be placed across the point where it intersects the work area line.
- ◆ An offset may be used in lieu of rope, chain etc..

Safety Monitor

- ◆ Identified as competent person.
- ◆ On same level, in visible sight of the workers.
- ◆ Close enough to communicate orally.
- ◆ Have no other duties that interfere with their monitoring.

Roofing Guardrail System



- ◆ This is one of many manufactured systems
- ◆ System can be constructed
- ◆ Must meet standard guardrail specifications

Roof Edge Material Handling and Storage Areas

- ◆ Workers in material handling/storage areas must be protected by a guardrail, safety net, or personal fall arrest system along unprotected edge.
- ◆ Warning line systems and safety monitors do not apply to these workers !

Roof Edge Material Handling and Storage Areas con't

- ◆ When guardrails are used in material hoisting areas or bitumen pipe outlets, at least 4 feet of guardrail length on each side of opening or outlet.
- ◆ Chain or gate across opening when hoisting operations are not taking place.

Roof Edge Material Handling and Storage Areas con't

- ◆ When personal fall arrest system is used, it must not be anchored to the hoist.
- ◆ When personal fall arrest system is used, it must be rigged to allow the movement of the worker only as far as the roof edge.

Roof Edge Material Handling and Storage Areas con't

- ◆ Materials must not be stored within 6 feet of roof edge, unless guardrails are present.
- ◆ Piled and stacked materials must be stable and self supporting.

Good, Bad or Ugly ?



- ◆ What's good about this work area ?
- ◆ What's bad about this operation ?
- ◆ Are these workers protected ?

Crawling Boards

- ◆ At least 10 inches wide and 1 inch thick.
- ◆ Must have cleats 1x1.5" minimum.
- ◆ Cleats must be equal to board width.
- ◆ Cleats equally spaced no more than 24 inches apart.
- ◆ Nails driven through and clinched.
- ◆ Boards secured and extend from ridge to eave.
- ◆ Each board must have a 3/4 inch rope for hand hold.

Roofing Brackets

- ◆ Secured by nailing.
- ◆ When impractical to nail, rope supports must be used.
- ◆ Rope must be first grade 3/4 inch minimum.

Well Protected Steep Slope Work



- ◆ Guardrail system along eave.
- ◆ Personal fall arrest system when within 6 feet of rake edge.
- ◆ This contractor has established a warning line depicting area which requires PFA system use.

Roofing Related Health Hazards

- ◆ Coal tar products can cause health problems.
- ◆ Over exposure to coal tar pitch vapors can cause severe dermatitis, damage to the kidneys and bladder.
- ◆ Over exposure can also cause problems such as emphysema, bronchitis and asthma.
- ◆ Cancer has also been linked to coal tar.

Controlling Roofing Related Health Hazards

- ◆ Substitute with less harmful material.
- ◆ Protect skin and respiratory system with proper PPE and clothing.
- ◆ Reduce kettle emissions by keeping covers closed as much as possible, using filters and recycling devices.
- ◆ Safe work practices such as working up-wind of kettle and wetting down old roofs before tear-off.

During a site visit you see this. What's the solution ?



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What's the solution ?**

